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Professional Perceptions of Integrated Project Delivery in Brazil: Conceptual Dissonance Between Governance Innovation and Technological Adoption

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Abstract

Integrated Project Delivery (IPD) is a collaborative approach proposed to address fragmentation and performance issues in the AEC industry, yet its adoption remains limited. This study examines Brazilian professionals' perceptions of IPD and identifies the barriers, challenges, and enablers associated with it. Drawing on a survey and a systematic review, the findings indicate that although benefits such as improved collaboration are recognized, concerns about contractual feasibility, shared risks, and organizational readiness persist. Technological aspects are seen as more familiar than contractual or managerial changes, diverging from international empirical evidence, which typically identifies contractual and governance-related challenges as the primary barriers to IPD adoption. The study reveals both shared global challenges and unique Brazilian issues, particularly regarding implementation complexity. Adoption depends more on organizational and contractual preparedness than on technology, informing strategies for introducing collaborative models in emerging markets.

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1. Introduction

The Architecture, Engineering, and Construction (AEC) sector is a vital part of the global economy, representing between 6% and 12% of the world's Gross Domestic Product [1]. Despite its economic importance, the industry continues to face structural issues, such as slow productivity gains [2] and fragmented workflows, adversarial contractual practices, and poor coordination among project stakeholders [3]. These problems are primarily linked to the use of traditional Project Delivery Methods (PDMs), like Design–Bid–Build (DBB), which are comprised of sequential steps, prohibit risk sharing, and favor individual interests over collective project success [4,5]. For this reason, the study and application of IPD contracts are gaining popularity [4,6]. However, the operationalization of such collaborative principles depends not only on contractual arrangements but also on the effective integration of information, processes, and actors throughout the project lifecycle.

Within this context, digitalization and collaborative practices have been promoted as key enablers of improved performance in the AEC industry. Building Information Modeling (BIM) has become especially prominent as a digital technology that improves

information management, coordination, and visualization throughout project phases [3]. Nonetheless, research shows that merely adopting digital tools is not enough to fix the sector's structural and organizational issues. Moreover, the increasing complexity of these technological advances requires a reconfiguration of process and PDM. Contract instruments are considered an enabler for construction projects due to their influence on project structures [7]. Successful application of these tools depends heavily on the project delivery framework within which they are used, rather than serving as standalone drivers of collaboration [4,8].

When integrated into traditional delivery methods, digital technologies often replicate existing fragmentation patterns [9]. Adversarial contracts, misaligned incentives, and risk-transfer mechanisms restrict the ability of tools like BIM to foster integrated decision-making and collective accountability, instead reinforcing siloed practices and promoting false collaboration [10,11]. This mismatch emphasizes the importance of rethinking not just the technological aspects of project delivery but also the contractual and governance frameworks that influence collaboration within the AEC sector.

In this context, Integrated Project Delivery (IPD) has become an alternative to traditional PDMs, offering a collaborative organizational and contractual framework that aims to realign incentives and encourage early, ongoing stakeholder involvement. IPD is based on principles such as involving key participants early, sharing risks and rewards, joint decision-making, and relational contracting, usually formalized through multiparty agreements [4,12–14]. Instead of being tied to specific tools or technologies, IPD is a governance approach designed to build trust, transparency, and collective responsibility throughout the entire project lifecycle [15].

Empirical studies in areas where IPD has been adopted indicate improvements in coordination, constructability, and predictability [16]. These studies show no consistent evidence of worse performance compared to traditional delivery methods [17]. However, the adoption of IPD varies widely, especially in regions lacking collaborative contractual practices. In these areas, there has been limited research into how industry professionals view IPD, including the obstacles, challenges, and motivators affecting its adoption [11].

Understanding professional perceptions is especially relevant in emerging and developing markets, where early interpretations of collaborative delivery models can shape adoption trajectories and influence how such models are understood and implemented within local industry contexts. In these settings, perceptions can determine whether IPD is approached as a strategic governance framework or incorporated in a partial and incremental manner, without corresponding changes to contractual arrangements and decision-making structures.

Accordingly, this article investigates professionals' perceptions in the Brazilian AEC sector regarding IPD, with the aim of identifying the main barriers, challenges, and drivers associated with its potential adoption. Based on a survey of Brazilian practitioners, the study analyzes levels of awareness, perceived feasibility of IPD principles, and anticipated impacts on project performance. The findings are discussed in light of the international literature, seeking to situate the Brazilian context within broader debates on IPD adoption.

The specific objectives of this study are to: (i) assess awareness and understanding of IPD among Brazilian AEC professionals; (ii) identify the primary perceived barriers and challenges to IPD adoption in Brazil; (iii) analyze how professionals evaluate the feasibility and expected impact of IPD principles; and (iv) elucidate the institutional preconditions necessary for transitioning from technology-centric to governance-centric project delivery models.

By providing an empirical diagnosis of professional perceptions in the Brazilian AEC industry, this study seeks to deepen understanding of the conditions necessary for IPD

dissemination in emerging markets, emphasizing the central roles of governance, culture, and contractual alignment in enabling effective collaboration.

This study uses a survey tool created by Canadian researchers [18] as its primary empirical foundation, since it fits within the larger doctoral research framework for this article. The present article presents part of the results of a doctoral thesis that investigates pathways for the adoption of IPD within Canada, to derive transferable lessons to inform potential adoption strategies in Brazil. As identified in a previously published Systematic Literature Review (SLR) [11], Brazil currently has no documented cases of completed IPD projects, which limits the feasibility of performance-based or case-driven analyses. In this context, a perception-based survey represents an appropriate methodological approach for exploring readiness, awareness, and perceived barriers in a market with limited practical exposure to IPD. Using an instrument previously applied in Canada provides methodological consistency and enables future comparative analyses between contexts in which IPD has been empirically implemented and those in which adoption remains incipient. Such comparisons are expected to support subsequent stages of the doctoral research by highlighting convergences and divergences in professional perceptions across different levels of market maturity, thereby contributing to elucidating the next steps for IPD adoption in Brazil.

2. Background

This study builds upon a prior SLR [11], which examined the international body of research on IPD with the aim of identifying the main barriers, challenges, and enabling conditions reported across empirical studies and completed IPD case analyses. Rather than providing an exhaustive theoretical discussion, the SLR synthesized recurring themes that structure how IPD adoption has been addressed in the literature. These themes provide the analytical basis for the comparative analysis developed in the present study.

Across the reviewed studies, organizational and cultural conditions emerge as a central dimension influencing IPD adoption. The literature consistently reports challenges related to stakeholder behavior, organizational culture, trust-building, and willingness to engage in collaborative practices. Given IPD's reliance on early involvement, joint decision-making, and collective accountability, these factors are described as critical to the effective functioning of the delivery method. Resistance to cultural change and difficulties in establishing collaborative behaviors are recurrently identified, particularly in contexts dominated by traditional, adversarial project delivery practices [11,19,20].

Contractual and governance arrangements also constitute a prominent theme in the literature. The SLR highlights that multiparty agreements and shared risk–reward mechanisms are foundational elements of IPD. At the same time, empirical studies report challenges associated with their practical implementation and ongoing management [11]. These challenges are commonly related to aligning incentives among project participants, operationalizing financial transparency, and sustaining joint governance structures throughout the project lifecycle [11,21,22]. Such issues are frequently discussed in relation to institutional environments historically shaped by bilateral contracting and risk transfer practices [14].

Managerial and process-related implications represent another recurring topic identified in the SLR. The literature emphasizes the increased coordination demands associated with integrated workflows, as well as the need for facilitation, leadership, and conflict-resolution capabilities [23]. These requirements differ from those typically developed under conventional project delivery methods and are often discussed as factors influencing organizational readiness for IPD adoption. However, as this study subsequently reveals, such conceptual clarity is often absent in emerging markets, where technological discourse dominates institutional innovation. Limitations in managerial capacity and process integra-

tion are frequently cited as challenges that affect the feasibility and perceived complexity of implementing IPD [11].

With respect to technology, the SLR consistently treats digital tools, particularly BIM, as supportive elements within IPD environments [11,24]. The literature describes BIM as an enabler of information sharing, coordination, and visualization that can support integrated practices when applied within appropriate organizational and contractual arrangements [4]. However, the review does not position technology as a defining characteristic of IPD nor as a primary driver of its adoption, maintaining a clear distinction between delivery method structures and digital capabilities [11].

Finally, the SLR indicates that reported challenges and enabling conditions vary according to contextual factors and prior experience with collaborative delivery models. In contexts where IPD has been implemented, studies tend to focus on operational, contractual, and managerial complexities encountered during project execution [11].

By consolidating these recurring themes, the SLR establishes a structured analytical reference against which the results of the present survey can be examined. This synthesis provides the basis for comparing professional perceptions in the Brazilian AEC sector with patterns identified in previous empirical studies, supporting the interpretation of convergences and divergences between locally reported perceptions and findings documented in the international literature.

3. Research Method

This study employs a mixed quantitative and qualitative research design to investigate perceptions of IPD in the Brazilian AEC sector. The research process comprised instrument adaptation, data collection, statistical analysis, and discussion.

To ensure future cross-regional comparability, the survey instrument was adapted from a previously validated questionnaire. The adaptation process involved translating the instrument into Portuguese, contextualizing terminology by replacing the term "owner" with "developer" to align with the Brazilian market structure, and removing questions related to Lean Construction tools in order to sharpen the focus on IPD characteristics. Prior to distribution, a pilot test was conducted with four academic experts to validate the instrument's semantic clarity and technical accuracy. The study also adopted the same qualitative coding framework proposed by Arar and Poirier [18], which enables direct comparison of perception patterns across markets with different levels of IPD maturity.

Open-ended responses to Questions 4 and 5 were analyzed using a deductive qualitative coding approach, based on the thematic framework originally developed by Arar and Poirier [18]. Coding categories were therefore predefined, ensuring methodological consistency and cross-context comparability. All responses were coded by the authors of the present study following the original category definitions. As a single coding procedure was adopted, no inter-coder disagreement arose.

To promote transparency and replicability, the complete survey instrument is detailed in Appendix A. The questionnaire consisted of ten key questions (Q1–Q10), comprising both closed-ended Likert-scale items and open-ended questions. Each item was explicitly linked to a specific analytical construct identified through the systematic literature review, including awareness, perceived impact, implementation comfort, and perceived obstacles. All Likert-scale questions employed a five-point ordinal scale. For perception and impact items, the scale ranged from 1 = Very negative to 5 = Very positive. Implementation readiness was rated from 1 = Very uncomfortable to 5 = Very comfortable. Perceived obstacle impact ranged from 1 = No impact to 5 = Very high impact. In all cases, higher scores consistently indicate a more positive perception or a greater perceived effect. This structure enables independent verification of the descriptive statistics and rankings presented in Section 4.

Data collection was conducted via Microsoft Forms over 133 days, concluding on 23 October 2024. Through a non-probabilistic snowball sampling strategy disseminated via professional networks, the study obtained 85 valid responses. Although the resulting sample size does not permit statistical generalization to the entire Brazilian AEC industry, it provides valuable qualitative and quantitative insights into the perceptions of a diverse group of professionals.

Data analysis was performed using the R programming environment. Descriptive statistics (mean and standard deviation) were calculated to rank perceived barriers and drivers. Additionally, the nonparametric Friedman test was used to assess the statistical significance of the differences among these rankings. This step ensures methodological consistency with the reference study and is particularly suited for the ordinal nature of the Likert-scale data collected.

Finally, a comparative analysis was conducted by juxtaposing the Brazilian dataset with the SLR [11].

4. Results

The survey provided insights gathered from a broad spectrum of professionals to gauge their familiarity with IPD, assess their knowledge, understand their perceptions of IPD's potential impact on project success, and identify perceived challenges that could hinder the successful implementation of IPD in Brazil.

4.1. Demographic Characteristics of Participants

The study participants predominantly held management and leadership positions, meaning that the data reflects strategic perspectives. Management roles—encompassing project, construction, and business management—accounted for 44% of the sample, whereas executive and directorial roles accounted for 25%. The remaining participants included designers (9%), coordinators (7%), and consultants (5%). This distribution incorporates viewpoints from both high-level decision-makers and professionals directly involved in technical project design.

The sample represented a range of industry sectors. The highest concentrations were observed in Engineering (22%), Architecture (15%), and Construction (13%), followed by Project Management firms (12%) and Public Agencies (11%). The inclusion of smaller segments, such as consultancies (6%) and real estate developers (4%), further diversified the dataset, ensuring a comprehensive view of the AEC industry (Figure 1).

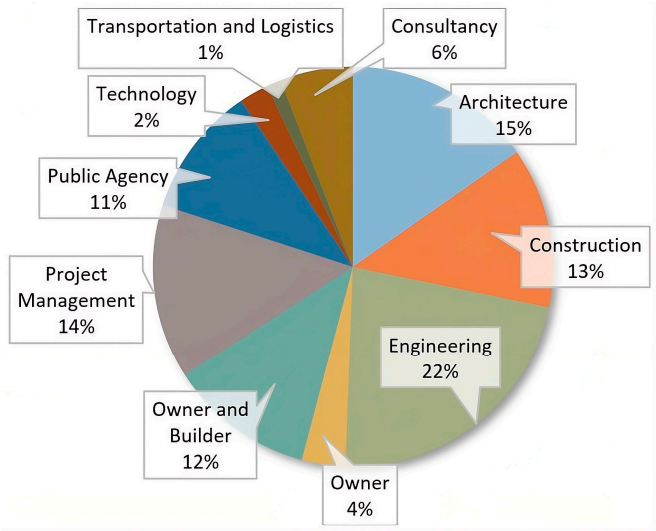

Figure 1. Company sector.

Regarding market segments, the participating companies showed a clear emphasis on the Private Sector (21%), with the Residential (20%) and Commercial (17%) markets also well-represented. The Public Sector accounted for 13%.

Geographically, while the respondents' companies operate nationally, there was a notable concentration in Brazil's more economically developed regions. As shown in Figure 2a, the Southeast (32%) and South (29%) account for the majority of the sample. However, there was additional representation from the Northeast (18%), Midwest (11%), and North (10%) regions (Figure 2a). The geographic concentration of respondents in the Southeast and South regions (61%) aligns with the economic and industrial distribution of the Brazilian AEC sector, as these regions account for the largest share of Brazil's GDP and construction activity [25]. As such, this distribution is considered broadly representative of the sector's geographic concentration rather than a sampling bias.

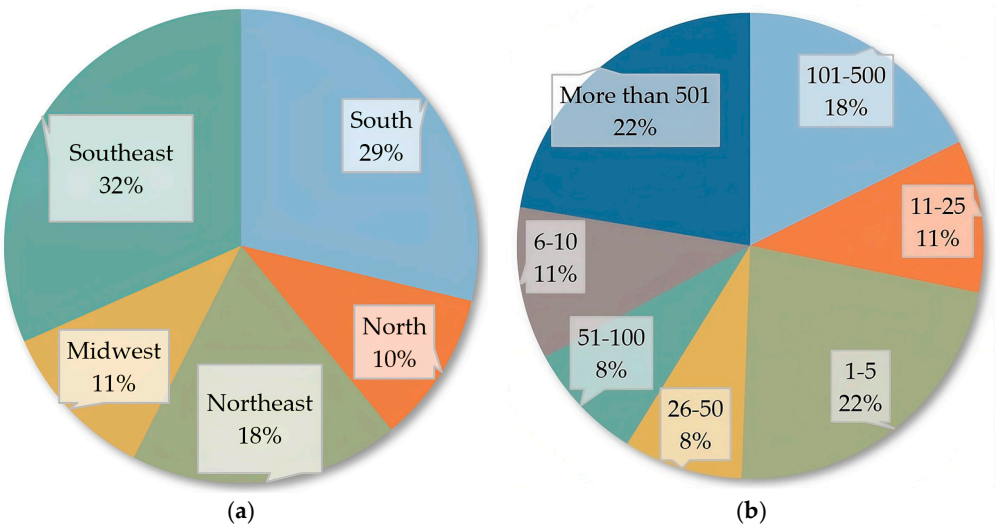

Figure 2. Geographical distribution (**a**) and company size representing the number of employees (**b**).

The organizational profile of the sample reflected a broad spectrum of sizes (Figure 2b). Micro and small firms (1–10 employees) constituted 33% of the sample, while large corporations (over 501 employees) accounted for 22%.

Financially, the private sector participants showed a wide distribution of annual revenues, with a significant proportion (49%) reporting revenues below BRL 10 million. Conversely, public sector agencies varied in their fiscal capacity, with annual investment budgets ranging from less than BRL 1 million (42%) to over BRL 500 million (12%).

This descriptive profile contextualizes the findings presented in the subsequent sections, providing a foundation for interpreting perceptions of IPD within the Brazilian AEC industry.

4.2. Awareness of IPD in the Brazilian Construction Industry

To assess the baseline awareness within the industry, respondents were initially asked about their familiarity with Integrated Project Delivery (IPD). Data from the preliminary questions (Q1–Q3) indicated that 44% of participants had prior knowledge of the concept (Figure 3). Among those who claimed familiarity, the depth of knowledge was generally limited; the majority rated their understanding as basic (Figure 4). Furthermore, theoretical knowledge did not necessarily translate into practice, as more than half of these respondents reported having no direct experience with IPD projects (Figure 5).

To minimize potential bias arising from initial unawareness or terminological confusion, Question 6 was introduced as a control measure. In this step, participants were

presented with a brief definition of IPD outlining its key contractual and managerial features. They were then asked to re-evaluate their recognition of the model.

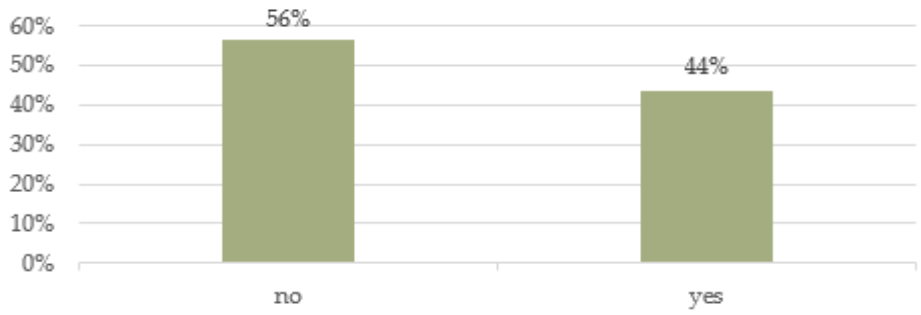

Figure 3. Participants' familiarity with IPD.

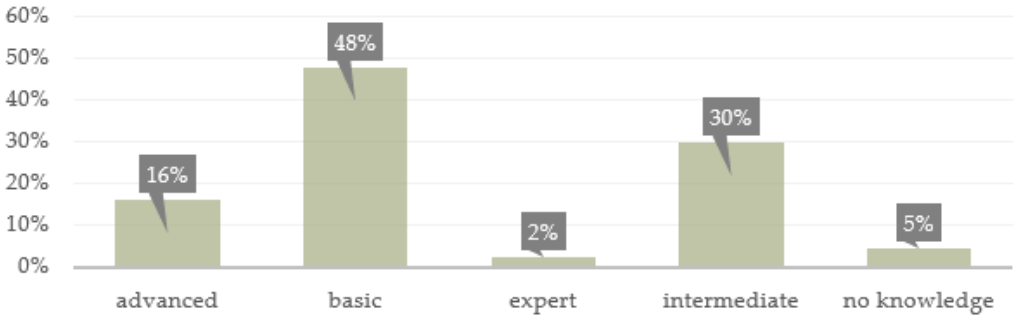

Figure 4. IPD knowledge level.

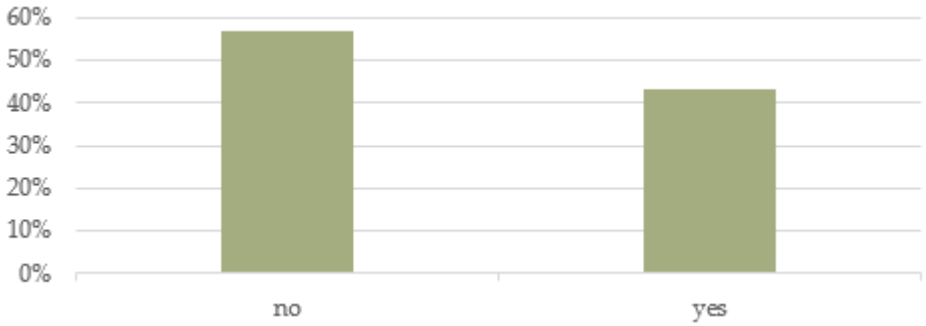

Figure 5. Possesses practical or theoretical experience working on an IPD project.

Following this informational stimulus, 52% of respondents recognized the IPD model, compared with 44% in the initial self-reported familiarity assessment. This difference is interpreted as recognition of IPD principles after minimal conceptual exposure, rather than as an increase in baseline knowledge or expertise. The results suggest that although the specific term "IPD" may not be widely known, its core principles are conceptually recognizable to a larger share of respondents when explicitly described.

4.3. Challenges and Considerations for IPD Implementation

Questions 4 and 5 are open-ended and qualitative in nature and were designed to enable a more detailed examination of the survey findings and to facilitate cross-referencing with the quantitative data collected in Questions 6–10. In Question 4, respondents were asked to briefly identify the three most significant challenges associated with the implementation of Integrated Project Delivery (IPD). The collected responses were subsequently coded and organized into thematic categories, as presented in Table 1.

The findings reveal that Resistance to Change (C7) was the most frequently identified barrier, mentioned 30 times. This underscores the prevalence of cultural and behavioral

challenges in Brazil's construction industry. The second most cited category was Knowledge and Understanding of IPD (C4), cited 23 times, suggesting ongoing information gaps and limited awareness of the methodology among professionals in Brazil. Other challenges often mentioned include Collaboration (C2, 14 mentions) and Contractual and Legal Challenges (C1, 12 mentions), highlighting the importance of organizational integration and the limitations of current contractual frameworks in Brazil.

Table 1. Most significant challenges perceived in IPD implementation.

Codification	Challenge Theme	Frequency
C7	Resistance to Change	30
C4	Knowledge and Understanding of IPD	23
C2	Collaboration	14
C1	Contractual and Legal Challenges	12
C9	Trust	10
C5	Project Management and Execution	9
C6	Stakeholder Alignment and Engagement	9
C10	Technological Adoption	9
C8	Financial and Budget Concerns	6
C3	Transparency and Open Communication	3

In Question 5, respondents were asked to briefly identify the three primary considerations for an organization in the AEC sector seeking to use IPD in its projects (Table 2). As in Question 4, the responses were subsequently coded and classified into thematic categories. The analysis of response frequencies indicates that the most frequently referenced theme was Project Team and Stakeholder Engagement (F), mentioned 13 times. This highlights the importance that Brazilian professionals place on the alignment, involvement, and integration of participants across organizational levels as necessary conditions for the adoption of IPD.

Table 2. Primary considerations for an organization in the construction sector looking to implement IPD.

Codification	Consideration Theme	Frequency
F	Project Team and Stakeholder Engagement	13
I	Financial Considerations and Incentives	12
C	Understanding Contractual, Legal, and Risk Aspects	11
D	Business, Corporate Culture, and Organizational Maturity	11
A	Training and Knowledge Enhancement	10
G	Decision-Making Aspects	5
B	Collaboration and Open Communication	4
H	Technological Tools and Innovations	2

The next most commonly cited factor was Financial Considerations and Incentives (I, 12 mentions), underscoring the importance of economic factors such as cost-sharing, incentives, and return on investment in shaping organizations' readiness to adopt IPD. Trailing closely behind were Business, Corporate Culture, and Organizational Maturity (D), and Understanding Contractual, Legal, and Risk Aspects (C), both of which were frequently identified (11 mentions each). These themes underscore the necessity of internal organizational preparedness, cultural alignment, and legal-structural modifications as critical factors for the successful implementation of IPD.

4.4. Perceived Impact of IPD Characteristics on Project Success

Question 7 was designed as a 5-point Likert scale, ranging from very negative to very positive, to elicit perceptions of the 20 IPD characteristics. The comprehensive statistical analysis, encompassing the mean, mode, median, and standard deviation (SD) for each attribute, provides nuanced insight into the industry's current perception of IPD, elucidating areas of agreement and disagreement among opinions (Table 3).

Table 3. The impact rate of IPD characteristics on the project success.

No	IPD Characteristic	Mean	Mode	Median	Standard Deviation	No	IPD Characteristic	Mean	Mode	Median	Standard Deviation
1	Integration of team members into interdisciplinary work groups	4.80	5	5	0.41	11	Incentives linked to overall project performance	4.48	5	5	1.02
2	Good working relationship among participants	4.75	5	5	0.49	12	Selection of team members based on best value	4.45	5	5	1.19
3	Implementation of new technologies. including BIM	4.68	5	5	0.86	13	Visual display and planning	4.43	5	5	0.87
4	Continuous performance measurement	4.68	5	5	0.83	14	Implementation of a "Big room"	4.30	5	4	0.79
5	Joint and collaborative decision-making	4.66	5	5	0.61	15	Execution of a relational contract	4.25	5	4	0.97
6	Shared rewards among project participants	4.64	5	5	0.53	16	Project at a target cost determined by everyone	4.05	5	4	1.24
7	Alignment around project values and objectives	4.57	5	5	0.90	17	Risk sharing among project participants	3.98	5	4	1.28
8	Mutual trust among project team members	4.55	5	5	1.00	18	Complete financial transparency	3.84	5	4	1.27
9	Identification of common values and objectives	4.55	5	5	0.59	19	Co-location of the team in a project office	3.66	3	4	1.22
10	Early involvement of subcontractors and suppliers	4.55	5	5	0.55	20	Waiver of legal action among the contract signatories	2.82	4	3	1.63

The descriptive statistics revealed that the most highly valued attributes were the inclusion of team members in interdisciplinary work groups, strong working relationships among participants, and the adoption of new technologies, such as BIM. These findings imply that professionals place greater significance on collaborative and integrative practices and on technological support as crucial elements for the successful implementation of IPD.

For the most part, the results indicate a mode of 4 or 5, suggesting a positive view of IPD principles. However, they also show significant variation in standard deviation, indicating disagreement among participants, as evidenced by IPD characteristics 12, 16 to 20, which reflect more heterogeneous perceptions.

The inferential analysis, conducted using the Friedman test (χ^2 = 206.95; df = 19; $p = 1.41 \times 10^{-33}$), supports these findings. The extremely low p-value (<0.05) confirms that the differences in evaluations are statistically significant, indicating that respondents did not view all IPD characteristics as equally important. Descriptive statistics indicate that respondents tended to assign higher ratings to collaborative and integrative practices compared to contractual and financial mechanisms. Although the Friedman test confirms overall differences in how IPD characteristics were evaluated, the observed ordering reflects descriptive patterns based on perceived evaluations.

4.5. Readiness for Implementing IPD in Brazil

Question 8 used a 5-point Likert scale, ranging from very uncomfortable to very comfortable. This question aimed to determine which IPD principles are perceived as easier to adopt by professionals (Table 4). The descriptive statistics indicate a clear ranking among the characteristics considered. The integration of team members into interdisciplinary work groups received the highest average score, followed closely by visual display and

planning, and the adoption of new technologies, including BIM. These findings indicate that, within the surveyed sample, respondents generally reported higher comfort with collaborative work dynamics and digital tools, while reporting lower comfort with practices related to contractual and legal arrangements. This interpretation is based on descriptive comparisons of mean ratings.

Table 4. Implementation comfort rate for IPD characteristics.

No	IPD Characteristic	Mean	Mode	Median	Standard Deviation	No	IPD Characteristic	Mean	Mode	Median	Standard Deviation
1	Integration of team members into interdisciplinary work groups	4.70	5	5	0.46	11	Identification of common values and objectives	4.30	5	5	1.07
2	Visual display and planning	4.66	5	5	0.57	12	Incentives linked to overall project performance	4.27	5	4	0.92
3	Implementation of new technologies, including BIM	4.64	5	5	0.65	13	Shared rewards among project participants	4.25	5	4	0.92
4	Continuous performance measurement	4.59	5	5	0.87	14	Identifying and executing the project with a target cost	4.14	4	4	1.11
5	Joint and collaborative decision-making	4.52	5	5	0.76	15	Creation of a "Big Room"	4.05	5	4	1.10
6	Early involvement of subcontractors and suppliers	4.45	5	5	0.73	16	Execution of a relational contract	3.73	4	4	1.23
7	Good working relationship among participants	4.34	5	5	0.89	17	Full financial transparency	3.52	4	4	1.28
8	Selection of team members based on best value	4.30	5	4.5	0.93	18	Risk sharing among project participants	3.50	4	4	1.39
9	Alignment of project participants around the project's values and objectives	4.30	5	5	1.00	19	Co-location of the team in a project office	3.41	4	4	1.26
10	Mutual trust among project team members	4.30	5	5	1.07	20	Waiver of legal action among the contract signatories	2.57	4	3	1.62

On the other hand, aspects related to more formal contractual innovations and legal mechanisms received the lowest ratings and showed the highest standard deviations. The waiver of legal action among contract signatories, the co-location of the team in a project office, and risk-sharing among participants ranked as the least favorable, indicating hesitation toward practices that require a significant shift from prevailing industry norms and contractual culture.

The Friedman test results support these conclusions. With a test statistic of $\chi^2 = 243.86$ (df = 19) and a p-value of 5.40×10^{-41}, the analysis confirms statistically significant differences in respondents' comfort levels across the IPD attributes. In short, participants do not view all practices as equally feasible. While collaborative and technological components seem more acceptable, innovations related to contracts and governance remain sources of discomfort and doubt.

4.6. Perceptions of IPD Impact on Project Performance Indicators

The assessment of Question 9 (Table 5) shows that respondents perceive different degrees of impact on project performance metrics due to the implementation of IPD, rated on a 5-point Likert scale from very negative to very positive.

The highest average scores are associated with early identification of conflicts and issues, followed by integration and collaboration among project team members and constructability. These findings indicate that professionals see IPD as having great potential to foresee failures, encourage interdisciplinary collaboration, and provide practical construction solutions, all of which enhance project efficiency and predictability. The indicators with the lowest ratings were the project's completion cost, the frequency of changes during the project, and the interactions between the client and the contractor. These findings indicate

some doubt regarding the short-term impact of IPD on lowering final costs or improving client–contractor relationships.

Table 5. Perceptions of the impact of implementing IPD on the following performance indicators.

No	Performance Indicators	Mean	Mode	Median	Standard Deviation
1	Early detection of conflicts and problems	4.75	5	5	0.44
2	Integration and collaboration among project team members	4.64	5	5	0.61
3	Constructability	4.57	5	5	0.59
4	Overall project performance	4.45	5	5	0.90
5	Overall quality of project systems	4.45	5	5	0.70
6	Overall project risk exposure	4.32	4	4	0.77
7	Schedule reliability	4.25	5	4	1.01
8	Cost reliability	4.20	4	4	1.00
9	Client/owner control over risks	4.16	5	4	1.14
10	Number of requests for information (RFIs)	4.16	4	4	0.99
11	Productivity of project team members	4.09	4	4	1.05
12	Number of problems or deficiencies	4.09	5	4	1.10
13	Team member satisfaction	4.07	5	4	1.19
14	Time required for decision-making	4.07	4	4	1.09
15	Client/owner satisfaction	4.05	5	4	1.16
16	Tax transparency	4.05	5	4	1.18
17	Total project duration	4.00	5	4	1.06
18	Relationship between client/owner and contractor	3.86	4	4	1.21
19	Number of changes during the project	3.86	4	4	1.09
20	Cost to complete the project	3.73	4	4	1.37

The Friedman test confirms these distinctions: the test statistic ($\chi^2 = 92.96$; df = 19; $p < 0.001$) indicates that the assessments varied across performance indicators, and the SD scores are high for most indicators, suggesting heterogeneous perceptions among participants. Participants tended to rate IPD as having a stronger perceived impact on indicators related to early problem detection, collaboration, and constructability than on indicators associated with final costs and contractual relationships. These results reflect perceived impact ratings rather than measured performance outcomes.

4.7. Perceptions of Primary Obstacles for IPD Implementation

In question 10, the participants in the survey ranked the primary obstacles to implementing IPD in Brazil with a 5-point Likert scale, from no impact to very high impact (Table 6). Among the 15 assessed factors, respondents tended to assign higher impact ratings to prevailing industry culture and behavior, unwillingness to share profits, and the continued use of lowest-bid selection methods. These findings suggest that cultural and behavioral aspects, as well as established procurement practices, are perceived by respondents as relevant obstacles to the implementation of collaborative approaches such as IPD.

Following these challenges, the industry stakeholders' lack of interest and incentives, insufficient knowledge of IPD, and limited understanding of its advantages also emerged as significant barriers. The results indicate that gaps in information and education, along with limited institutional incentives, were generally rated as having a moderate to high perceived impact on IPD adoption.

The findings indicate that the challenges are not perceived as equally significant, as evidenced by the Friedman test ($\chi^2 = 68.67$; df = 14; p-value = 3.36×10^{-9}), which reveals statistically significant differences in respondents' assessments of these obstacles. In general, SD scores are moderate or low, with fewer high scores, indicating a more cohesive understanding among participants.

Table 6. The primary obstacles to implementing IPD in Brazil.

No	Impact for IPD Implementation	Mean	Mode	Median	Standard Deviation
1	Predominant culture and behavior in the sector	4.61	5	5	0.62
2	Reluctance to share profits	4.57	5	5	0.62
3	Selection based on the lowest bid	4.50	5	5	0.76
4	Lack of interest and incentives from sector stakeholders	4.34	5	4	0.75
5	Lack of knowledge about IPD	4.32	5	5	1.03
6	Lack of knowledge of the benefits of IPD	4.30	4	4	0.73
7	Legal and contractual difficulties	4.25	5	4.5	0.87
8	Uncertainty regarding return on investment	4.25	5	4	0.81
9	Lack of familiarity with BIM and its principles	4.11	4	4	0.72
10	Absence of fair sharing of profits and losses	4.07	5	4	1.34
11	Lack of trust in IPD	3.93	5	4	0.97
12	Complexity of IPD implementation	3.91	4	4	1.03
13	High implementation costs	3.84	4	4	1.16
14	Lack of external support	3.77	4	4	1.08
15	Lack of demand from clients/owners	3.64	4	4	1.40

4.8. The Demand for IPD in Brazil

The final question in this survey on IPD sought to assess demand for or interest in adopting IPD in the Brazilian AEC market. To that end, participants were asked, in an open-ended question, about their interest in and reasons for participating in an IPD project, and 95% responded positively. Among those who answered "yes," several acknowledged existing concerns but expressed a strong interest in learning, recognizing that IPD can offer multiple benefits. Conversely, the 5% who responded negatively justified their position either by stating that IPD does not apply to their field or by citing insecurity stemming from limited knowledge and the limited dissemination of this project delivery method.

5. Cross Analysis from Brazilian Survey vs. SLR

The comparative analysis between the results of the SLR, which represents a global scenario, and the Brazilian survey reveals both convergences and divergences regarding the perceived challenges to the adoption of IPD. This comparison provides essential insights into how internationally identified barriers manifest in a context in which IPD has no established implementation history.

Table 7 synthesizes this crossing, categorizing the main challenges identified in both research fronts and classifying the relationship between them as "Convergence" or "Dissonance". The data displayed in the SLR Data (Global Scenario) column comes from the previously conducted SLR.

The comparative analysis highlights a strong agreement on the importance of the human factor. Both international studies and Brazilian professionals see organizational culture as the primary obstacle to adopting IPD. The SLR notes that "Cultural change," which involves shifting focus from individual goals to shared objectives, remains a persistent barrier across many countries. In Brazil, this issue is especially prominent, with "Resistance to Change" being the most significant barrier. This suggests that, regardless of market maturity, transitioning from a competitive to a collaborative mindset is the primary challenge in implementing IPD.

Another common issue is financial risk. Developing effective profit and risk-sharing models is a widespread challenge. Although international research emphasizes the technical difficulty of designing precise and transparent financial systems, the Brazilian market reflects this through a "Reluctance to share profits", the second most significant barrier. This indicates that financial mistrust and resistance to open-book accounting are common across the construction industry worldwide.

Table 7. Survey and SLR comparison.

Theme/Challenge Category	SLR Data (Global Scenario)	Survey Data (Brazilian Scenario)	Status
Cultural and Behavioral Resistance	Categorized as "People" and "Cultural Change", it is one of the most cited challenges (6% of external and internal threats).	Classified as barrier 1 in the quantitative ranking ("Predominant culture", M = 4.61) and 1 in open responses ("Resistance to Change", 30 mentions).	Convergence
Remuneration Models (Profits and Risks)	Difficulty in "establishing a model to measure and share profit/risk" is a recurrent weakness (6%).	"Reluctance to share profits" is barrier 2 in the quantitative ranking (M = 4.57).	Convergence
Role of Technology (BIM)	Technology is a supporting pillar ("Technology"), and interoperability is a technical challenge, but not the defining characteristic of the method.	"Lack of familiarity with BIM" appears as a relevant barrier (M = 4.11).	Dissonance
Legal and Contractual Aspects	Contractual challenges are central and frequently cited as primary barriers in markets in transition.	"Legal and contractual difficulties" ranks only 7th in the quantitative ranking (M = 4.25).	Dissonance
Management and Processes	"Managerial inefficiency" is the most frequently cited internal weakness (10%), attributable to the complexity of the integrated workflow.	"Complexity of IPD implementation" appears only in 12th place (M = 3.91).	Dissonance

The dissonances identified shed light on Brazil's stage of adoption. While international challenges are mostly procedural and contractual, centered on how to implement contracts, Brazilian challenges tend to be more conceptual and perceptual, focusing on the nature of the method itself. The SLR considers technology as one of the four pillars of IPD, emphasizing integration and decision support. Conversely, in Brazil, there is a conceptual dissonance: the market often confuses the technological tool (BIM) with the project delivery method (IPD).

In markets where IPD is already practiced, "Managerial inefficiency" and contractual issues are frequently cited, as practitioners are aware of the real difficulty of managing a multiparty contract. In Brazil, however, "Complexity of IPD implementation" and "Legal and contractual difficulties" appear in secondary positions in the ranking (12th and 7th places, respectively). This contrast suggests a lack of practical experience. Because they have not experienced the operational demands of a real IPD contract, Brazilian professionals tend to underestimate the legal and managerial effort required, focusing their concerns almost exclusively on the cultural entry barrier.

6. Discussion

The cross-analysis of the data, when contrasted with the global landscape established by the SLR, indicates patterns that suggest a form of conceptual dissonance in how IPD is perceived within the Brazilian AEC sector. This interpretation is directly supported by the obstacle ranking and the qualitative responses. In the obstacle assessment, factors related to limited BIM maturity, difficulties in using BIM tools, and challenges in performing clash detection were consistently rated among the most relevant barriers to IPD adoption.

In parallel, respondents frequently associated IPD implementation with technological readiness rather than with contractual or governance-related transformations. Together, these findings indicate that project delivery methods are often interpreted primarily through a technological lens, which contrasts with the international literature that frames IPD as a governance and contractual strategy supported, but not defined, by digital tools.

Unlike more mature markets, where BIM is primarily described in the literature as an enabler of collaborative governance structures, the Brazilian data indicate a different emphasis. Respondents consistently rated BIM-related limitations as high-impact obstacles, while simultaneously reporting low comfort with contractual mechanisms such as financial transparency and risk and reward sharing. This combination suggests that, within the surveyed sample, the implementation challenge is predominantly framed as technical, potentially diverting attention from the contractual restructuring required for IPD.

This stance suggests a market still in the process of maturation and learning, particularly as legal and contractual challenges tend to be underestimated. In contexts where IPD is more established, contractual complexity and managerial inefficiencies are frequently cited as primary barriers, reflecting accumulated experience with the demands of managing multiparty agreements. In Brazil, however, legal and contractual difficulties appear only in secondary positions among perceived barriers. This finding does not indicate legal ease, but rather limited practical exposure. In the absence of experience with actual IPD contracts, professionals tend to underestimate the legal effort involved and focus predominantly on cultural and technological entry barriers. Supporting this interpretation, cross-referencing demographic data with qualitative and quantitative responses indicates that participants who rated their knowledge as intermediate, advanced, or expert most frequently cited difficulties with BIM tools, low BIM maturity, and challenges in performing clash detection as the main barriers to IPD adoption.

This pattern is further reflected in the prominence of cultural and behavioral factors among the highest-ranked obstacles. Qualitative responses repeatedly emphasized resistance to change, lack of trust, and difficulty in sharing responsibilities, while quantitative results indicated low comfort with financial transparency and shared risk mechanisms. Together, these findings point to a misalignment between openness to technical collaboration and reluctance toward financial and contractual integration. This pattern suggests that the Brazilian market seeks to adopt IPD within traditional contractual structures, attempting to capture the efficiency gains of integrated production while preserving commercial silos and individual accountability.

An apparent tension emerges when comparing the low perceived comfort and impact associated with specific contractual mechanisms of IPD, such as waivers of litigation, full transparency, and risk and reward sharing, with the relatively lower ranking of legal and contractual issues as perceived obstacles to IPD implementation. This tension can be interpreted by considering the different analytical levels captured by these results. While the obstacle ranking reflects respondents' perceptions of broader structural and systemic barriers to adoption, the low comfort levels associated with specific contractual provisions reflect uncertainty regarding their practical application at the project level. In this sense, contractual issues are not perceived as primary external barriers imposed by the legal framework, but rather as challenges related to limited experiential familiarity and perceived risk in collaborative contracting contexts. This interpretation aligns with the higher ratings attributed to cultural and behavioral factors among the identified obstacles, without implying causal relationships.

Furthermore, stagnation in IPD adoption appears to be reinforced by misaligned expectations across hierarchical levels. Data segmentation reveals divergent perspectives: strategic leadership, including owners and directors, tends to view IPD primarily through the lens of financial risk and uncertain return on investment, while operational actors, such as designers and consultants, focus on technical implementation challenges and limited proficiency in BIM. This gap creates a self-reinforcing cycle. Technical teams, although willing to collaborate, lack the authority to modify contractual arrangements, while decision-makers, skeptical about cost reductions, adopt a reactive stance, waiting for ex-

ternal client demand rather than positioning IPD as a competitive advantage. For IPD to advance in Brazil, it is therefore necessary to move beyond a purely instrumental interpretation. The path toward consolidation requires dissociating IPD from BIM in sectoral discourse. Technology must be reaffirmed as an operational means, while IPD should be repositioned among stakeholders as a governance strategy aimed at risk mitigation and business predictability.

7. Conclusions

This investigation provides an empirical assessment of the Brazilian AEC sector's readiness to adopt IPD. By comparing local perceptions with the global landscape, the study reveals a market in transition, marked by a functional dichotomy: there is a clear desire for the benefits of integration, but a structural aversion to the contractual and financial mechanisms required for its feasibility.

The first critical conclusion of this study is the identification of a conceptual dissonance that distinguishes the Brazilian context. Unlike more mature markets, where technology serves as a supporting pillar, in Brazil, IPD is confused with a technological tool (BIM). Qualitative evidence that experienced professionals associate the primary challenges of the method with operational tasks, such as clash detection, indicates that the knowledge gap is not merely an absence of information but a misinterpretation of the method's purpose. This instrumental view obscures the need for contractual and managerial restructuring highlighted by the international literature.

Secondly, the study confirms that the primary barrier to adoption is not technical, but cultural. Resistance to change and reluctance to share profits emerge as obstacles more significant than legal difficulties, aligning Brazil with the global trend that human factors are more critical than procedural ones. However, the local specificity lies in the paradox of desiring the efficiency of collaboration while rejecting the vulnerability of financial transparency and shared risk. This suggests that the sector seeks to innovate in production processes without abandoning the protection of traditional silos of commercial liability.

Finally, the segmented analysis demonstrates that stagnation in adoption stems from a misalignment of expectations between strategy and operations. While technical teams demonstrate operational readiness to collaborate (via BIM and visual planning), strategic decision-makers remain skeptical of the business model, viewing IPD through the lens of financial risk rather than as a means to improve collaboration and enhance predictability.

Consequently, to advance the implementation of IPD in Brazil, it is imperative to dissociate the method from the technology in sectoral discourse. The path to consolidation requires that IPD be repositioned with decision-makers as a business strategy, while BIM consolidates itself as the operational means. Without this conceptual clarification and the development of a culture of mutual trust, integration initiatives risk being limited to isolated technological improvements, failing to capture the real value that genuine contractual integration can offer.

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Abbreviations

The following abbreviations are used in this manuscript:

IPD	Integrated Project Delivery
BIM	Building Information Modelling
AEC	Architecture, Engineering, and Construction
SLR	Systematic Literature Review
DBB	Design Bid Build
PDM	Project Delivery Method

Appendix A

Table A1. Final survey items, constructs, and measurement scales.

Question	Description	Construct	Scale & Anchors
Q1	Prior to this survey, were you familiar with the concept of Integrated Project Delivery (IPD)?	Awareness	Categorical (Yes/No)
Q2	How would you rate your level of knowledge about IPD?	Awareness	1 = Very low to 5 = Very high
Q3	Do you have practical or theoretical experience working on an IPD project?	Awareness	Categorical
Q4	In your opinion, what are the three main challenges to implementing IPD?	Obstacles	Open-ended
Q5	What are the three main considerations for an organization intending to adopt IPD?	Enablers	Open-ended
Q6	After reading the definition above, do you recognize IPD as a project delivery method?	Awareness (control)	Categorical
Q7	How do you rate the impact of the following IPD characteristics on project success?	Perceived impact	1 = Very negative to 5 = Very positive
Q8	How comfortable would you feel implementing the following IPD characteristics?	Implementation comfort	1 = Very uncomfortable to 5 = Very comfortable
Q9	How do you assess the impact of IPD on the following performance indicators?	Perceived impact	1 = Very negative to 5 = Very positive
Q10	To what extent do the following factors represent obstacles to IPD adoption in Brazil?	Obstacles	1 = No impact to 5 = Very high impact

References

1. WEF. *Shaping the Future of Construction: A Breakthrough in Mindset and Technology*; WEF: Geneva, Switzerland, 2016.
2. Teicholz, P. Trends in Labor Productivity in the Construction Industry. In Proceedings of the Symposium Project Production Institute, San Francisco, CA, USA, 9 December 2015.
3. Barbosa, F.; Woetzel, J.; Mischke, J. *Reinventing Construction: A Route to Higher Productivity*; McKinsey Global Institute and McKinsey's Capital Projects & Infrastructure Practice: Chicago, IL, USA, 2017.

4. Fischer, M.; Khanzode, A.; Reed, D.P.; Ashcraft, H.W. *Integrating Project Delivery*; John Wiley & Sons: Hoboken, NJ, USA, 2017; ISBN 0470587350,9780470587355.
5. Hamzeh, F.; Rached, F.; Hraoui, Y.; Karam, A.J.; Malaeb, Z.; El Asmar, M.; Abbas, Y. Integrated Project Delivery as an Enabler for Collaboration: A Middle East Perspective. *Built Environ. Proj. Asset Manag.* **2019**, *9*, 334–347. [CrossRef]
6. Ahmed, M.O.; Abdul Nabi, M.; El-adaway, I.H.; Caranci, D.; Eberle, J.; Hawkins, Z.; Sparrow, R. Contractual Guidelines for Promoting Integrated Project Delivery. *J. Constr. Eng. Manag.* **2021**, *147*, 05021008. [CrossRef]
7. Becerik-Gerber, B.; Asce, A.M.; Kensek, K. Building Information Modeling in Architecture, Engineering, and Construction: Emerging Research Directions and Trends. *J. Prof. Issues Eng. Educ. Pract.* **2010**, *136*, 139–147. [CrossRef]
8. Abaurre, M.W. Modelos de Contrato Colaborativo e Projeto Integrado Para Modelagem Da Informação Da Construção. Master's Thesis, Universidade de São Paulo, São Paulo, Brazil, 2013.
9. Assaf, M.; Salami, L.; Salhab, D.; Hammad, A. Promoting the IPD Delivery Method in Construction Projects: A BIM-Based Smart Contract Approach. In Proceedings of the 31st Annual Conference of the International Group for Lean Construction (IGLC31), Lille, France, 26 June–2 July 2023; pp. 69–80. [CrossRef]
10. Manzanares, F.V.; García-Segura, T.; Pellicer, E. Contract Conditions and BIM Use Effectiveness to Improve Project Performance. *Adv. Civ. Eng.* **2023**, *2023*, 2629608. [CrossRef]
11. da Silva, P.H.; Fischman, A.; Scheer, S.; Melhado, S.B. The IPD Contract Methodology as a Strategic Element in the Management of Building Projects. In *Advances in Information Technology in Civil and Building Engineering*; Springer: Cham, Switzerland, 2025; pp. 425–444.
12. AIA. *Integrated Project Delivery: A Guide California Council National*; AIA: Sacramento, CA, USA, 2007.
13. Mesa, H.A.; Molenaar, K.R.; Alarcón, L.F. Exploring Performance of the Integrated Project Delivery Process on Complex Building Projects. *Int. J. Proj. Manag.* **2016**, *34*, 1089–1101. [CrossRef]
14. Elghaish, F.; Abrishami, S.; Hosseini, M.R. Integrated Project Delivery with Blockchain: An Automated Financial System. *Autom. Constr.* **2020**, *114*, 103182. [CrossRef]
15. Esther Paik, J.; Miller, V.; Mollaoglu, S.; Aaron Sun, W. Interorganizational Projects: Reexamining Innovation Implementation via IPD Cases. *J. Manag. Eng.* **2017**, *33*, 04017017. [CrossRef]
16. Poirier, E.; Arar, A.J.; Staub-French, S.; Zadeh, P.; Bhonde, D. *Investigating Factors Leading to IPD Project Success in Canada*; IPDA: Edmonton, AB, Canada, 2022.
17. Ashcraft, H. Transforming Project Delivery: Integrated Project Delivery. *Oxf. Rev. Econ. Policy* **2022**, *38*, 369–384. [CrossRef]
18. Arar, A.J.; Poirier, E. Integrated Project Delivery (IPD) in Quebec: Exploring Awareness, Perceptions, and Challenges. In *Proceedings of the Canadian Society for Civil Engineering Annual Conference 2024*; Springer: Cham, Switzerland, 2024.
19. Pishdad-Bozorgi, P.; Beliveau, Y.J. Symbiotic Relationships between Integrated Project Delivery (IPD) and Trust. *Int. J. Constr. Educ. Res.* **2016**, *12*, 179–192. [CrossRef]
20. Mesa, H.A.; Molenaar, K.R.; Alarcón, L.F. Comparative Analysis between Integrated Project Delivery and Lean Project Delivery. *Int. J. Proj. Manag.* **2019**, *37*, 395–409. [CrossRef]
21. Thomsen, C.; Darrington, J.; Dunne, D.; Lichtig, W. Managing Integrated Project Delivery. In *The Handbook of Project Management*; Routledge: Abingdon, UK, 2009; Volume 105, pp. 175–186.
22. Elghaish, F.; Abrishami, S. A Centralised Cost Management System: Exploiting EVM and ABC within IPD. *Eng. Constr. Archit. Manag.* **2020**, *28*, 549–569. [CrossRef]
23. Laurent, J.; Leicht, R.M. Practices for Designing Cross-Functional Teams for Integrated Project Delivery. *J. Constr. Eng. Manag.* **2019**, *145*, 05019001. [CrossRef]
24. Piroozfar, P.; Farr, E.R.P.; Zadeh, A.H.M.; Timoteo Inacio, S.; Kilgallon, S.; Jin, R. Facilitating Building Information Modelling (BIM) Using Integrated Project Delivery (IPD): A UK Perspective. *J. Build. Eng.* **2019**, *26*, 100907. [CrossRef]
25. IBGE. *Produto Interno Bruto (PIB)*; IBGE: Rio de Janeiro, Brazil, 2025. Available online: https://www.ibge.gov.br/explica/pib.php (accessed on 8 February 2026).